

CLAIMS:

1. A powder coating composition comprising

A) one or more crosslinkers

5 and

B) one or more polyesters containing one or more COOH groups, OH groups, or both COOH and OH groups, wherein the polyester comprises

B1) from 10 to 80% by weight of at least one amorphous polyester based on the total weight of the polyester,

10 B2) from 20 to 90% by weight, based on the total weight of the polyester, of at least one (semi)crystalline polyester comprising polymerized units of from 50 to 100 mol% of at least one of succinic acid, adipic acid, sebacic acid or dodecanedioic acid, anhydride or ester thereof, and from 50 to 100 mol% of at least one of monoethylene glycol, butane-1,4-diol or hexane-1,6-diol,

15 wherein the polyester has an OH number of from 0 to 200 mg KOH/g and a COOH number of from 0 to 150 mg KOH/g, wherein at least one of the COOH number or OH number is greater than zero, and from 0.6 to 1.2 reactive groups of the crosslinker is present per functional group of the polyester.

20 2. The powder coating composition as claimed in claim 1, further comprising C) 1-50% by weight of one or more auxiliaries and additives.

3. The powder coating composition as claimed in claim 1, wherein the polyester comprises:

25 B1) 60-70% by weight of at least one amorphous polyester and

B2) 30-40% by weight of at least one (semi)crystalline polyester.

30 4. The powder coating composition as claimed in claim 1, wherein the amorphous polyester B1) has a COOH number, OH number or both a COOH number and an OH number of 15-200 mg KOH/g, a Tg of 35-85°C, a melting range of 60 to 110°C, a hydroxyl number, an acid number or both an hydroxyl number and an acid number of < 10 mg KOH/g, and a molar mass of from 2,000 to 7,000.

5. The polyester powder coating material as claimed in claim 4, wherein the polyester B1) comprises polymerized units of one or more selected from the group consisting of isophthalic acid, phthalic acid, adipic acid, azelaic acid, sebacic acid, dodecanedioic acid, trimellitic acid, hexahydroterephthalic acid, hexahydrophthalic acid, succinic acid and 1,4-
5 cyclohexanedicarboxylic acid.

6. The polyester powder coating material as claimed in claim 5, wherein the amorphous polyester comprises one or more linear, aliphatic or cycloaliphatic diols.

10 7. The polyester powder coating material as claimed in claim 6, comprising one or more polymerized units selected from the group consisting of monoethylene glycol, diethylene glycol, Dicidol, neopentylglycol hydroxypivalate, neopentylglycol, cyclohexanediethanol, butane-1,4-diol, pentane-1,5-diol, pentane-1,2-diol, hexane-1,6-diol and nonane-1,9-diol.
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8. The polyester powder coating material as claimed in claim 1, wherein the (semi)crystalline polyester B2) has a COOH number, an OH number or both a COOH number and an OH number of 15-150 mg KOH/g, a melting point of between 60 and 130°C, a glass transition temperature < -10°C, and a weight average molecular weight of between 1,800 and
20 6,500.

25 9. The polyester powder coating material as claimed in claim 8, wherein the (semi)crystalline polyester B2) comprises one or more of succinic acid, adipic acid, sebacic acid, or dodecanedioic acid in an amount of at least 50 mol%, based on the total amount of all carboxylic acids.

10. The polyester powder coating material as claimed in claim 9, comprising not more than 50 mol%, of other aliphatic, cycloaliphatic or aromatic dicarboxylic acids.

30 11. The polyester powder coating material as claimed in claim 10, comprising one or more of glutaric acid; azelaic acid; 1,4-, 1,3- or 1,2-cyclohexanedicarboxylic acid; terephthalic acid; or isophthalic acid.

12. The polyester powder coating material as claimed in claim 9, comprising one or more of monoethylene glycol, butane-1,4-diol, or hexane-1,6-diol in an amount of at least 80 mol%, based on the total amount of all polyols.
- 5 13. The polyester powder coating material as claimed in claim 12, comprising not more than 20 mol% of other aliphatic polyols, cycloaliphatic polyols, linear polyols or branched polyols.
- 10 14. The polyester powder coating material as claimed in claim 13, comprising one or more of diethylene glycol, neopentylglycol hydroxypivalate, neopentylglycol, cyclohexanedimethanol, pentane-1,5-diol, pentane-1,2-diol, nonane-1,9-diol, trimethylolpropane, glycerol or pentaerythritol.
- 15 15. The polyester powder coating material as claimed in claim 1, where the crosslinker A) is at least one of TGIC, a TGIC compound, a β -hydroxyalkylamide, or a combination thereof.
- 20 16. The polyester powder coating material as claimed in claim 15, comprising one or more β -hydroxyalkylamides of the formula
- $$\left[\begin{array}{c} \text{HO} - \text{CH} - \text{CH}_2 - \text{N} - \text{C} \end{array} \right]_m \text{A} \left[\begin{array}{c} \text{O} \\ \parallel \\ \text{C} - \text{N} - \text{CH}_2 - \text{CH} - \text{OH} \end{array} \right]_n$$
- 25 where R_1 is hydrogen, an aromatic radical or a C_1 - C_5 alkyl group, R_2 is hydrogen, an aromatic radical, a C_1 - C_5 alkyl group or
- $$\begin{array}{c} \text{HO} - \text{CH} - \text{CH}_2 - \\ | \\ R_1 \end{array}$$
- 30 and A is a chemical bond or a monovalent or polyvalent organic group selected from the group consisting of saturated, unsaturated and aromatic hydrocarbon groups, and substituted hydrocarbon groups having from 2 to 20 carbon atoms, m is 1 to 2, n is 0 to 2, and m + n is at least 1.

17. The polyester powder coating material as claimed in claim 16, comprising 2-10% by weight of a β -hydroxyalkylamide.

5 18. The polyester powder coating material as claimed in claim 1, wherein the crosslinker comprises one or more polyisocyanates having a functionality of ≥ 1.7 .

10 19. The polyester powder coating material as claimed in claim 18, wherein the polyisocyanates are externally blocked, internally blocked or both internally and externally blocked.

15 20. The polyester powder coating material as claimed in claim 18, wherein the polyisocyanates comprise one or more polymerized monomer units selected from the group consisting of IPDI, HDI and HMDI.

20 21. The polyester powder coating material as claimed in claim 18, wherein the polyisocyanates comprise one or more polymerized units selected from the group consisting of a urethane group, an isocyanurate group and an uretdione group.

25 22. A method comprising:
 applying one or more polyester powder coating materials on a substrate to form a coating with a matt appearance,

 wherein the polyester powder coating material comprises:

 A) one or more crosslinkers

30 and

 B) one or more polyesters containing one or more COOH groups, OH groups, or both COOH and OH groups, wherein the polyester comprises

 B1) from 10 to 80% by weight of at least one amorphous polyester based on the total weight of the polyester,

 B2) from 20 to 90% by weight, based on the total weight of the polyester, of at least one (semi)crystalline polyester comprising polymerized units of from 50 to 100 mol% of at least one of succinic acid, adipic acid, sebacic acid or dodecanedioic acid, anhydride or ester thereof, and from 50 to 100 mol% of at least one of monoethylene glycol, butane-1,4-diol or hexane-1,6-diol, and

wherein the polyester has an OH number of from 0 to 200 mg KOH/g and a COOH number of from 0 to 150 mg KOH/g, wherein at least one of the COOH number or OH number is greater than zero, and from 0.6 to 1.2 reactive groups of the crosslinker is present per functional group of the polyester.